

The mass of the compact object in the low-mass X-ray binary 2S 0921-630

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Abstract

We interpret the observed radial-velocity curve of the optical star in the low-mass X-ray binary 2S 0921-630 using a Roche model, taking into account the X-ray heating of the optical star and screening of X-rays coming from the relativistic object by the accretion disk. Consequences of possible anisotropy of the X-ray radiation are considered. We obtain relations between the masses of the optical and compact (X-ray) components, m_v and m_x , for orbital inclinations $i = 60^\circ, 75^\circ$, and 90° . Including X-ray heating enabled us to reduce the compact object's mass by ~ 0.5 - $1 M_\odot$, compared to the case with no heating. Based on the K0III spectral type of the optical component (with a probable mass of $m_v \approx 2.9 M_\odot$), we concluded that $m_x \approx 2.45$ - $2.55 M_\odot$ (for $i = 75^\circ$ - 90°). If the K0III star has lost a substantial part of its mass as a result of mass exchange, as in the V404 Cyg and GRS 1905+105 systems, and its mass is $m_v \approx 0.65$ - $0.75 M_\odot$, the compact object's mass is close to the standard mass of a neutron star, $m_x \approx 1.4 M_\odot$ (for $i = 75^\circ$ - 90°). Thus, it is probable that the X-ray source in the 2S 0921-630 binary is an accreting neutron star. © Pleiades Publishing, Inc., 2006.

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